5.0 RESIDUAL AND CUMULATIVE IMPACTS

5.1 Commitment of Resources

Some resources may be adversely affected for the short term (less than 3 to 5 years), i.e., during and immediately following construction, and others may be adversely affected for the long term. Long-term (greater than 3 to 5 years) is defined as the 30- to 35-year operational life of the project or beyond. Many of the impacts associated with project construction would cease to be adverse after the ROW rehabilitation is completed. No significant decrease in resource productivity would be expected as a result of construction-related impacts. Operation of the enhanced oil recovery program at the Hartzog Draw, Salt Creek, and Sussex oil fields would enable up to 20 million barrels of additional oil to be produced; recovered oil would be consumed and lost for future use, representing an irreversible impact. Table 5-1 summarizes the long-term and short-term effects of the proposed project and indicates whether a resource would be irreversibly or irretrievably affected.

Construction and operation of the proposed pipeline could irreversibly or irretrievably commit certain environmental or energy resources. An irreversible commitment of resources relates to the loss of future options for those resources; an irreversible impact applies primarily to the effect on the use of nonrenewable resources, such as minerals. The irretrievable commitment of resources means a loss of production, harvest, or use of natural resources for a finite period. Potential irreversible and irretrievable resource commitments for the proposed PSC Project could include paleontological and cultural resources.

5.2 Residual Impacts

The residual impacts of the proposed project are expected to be minimal and primarily be short-term, assuming the applicable environmental protection measures (Section 2.5 and POD) are effectively applied. Some of the residual adverse impacts associated with the pipeline are considered unavoidable because of the nature of pipeline construction. The linear ROWs cannot, in most cases, avoid crossing rivers and streams, and the pipeline cannot be buried without trenching. Most of these impacts are short-term; however, some small surface areas are required during the life of the project for support structures. These structures are required for the safe operation of the system (e.g., block valves).

Unavoidable short-term impacts from the project would include land surface disturbance resulting in vegetation cover loss and, consequently, loss of wildlife and livestock forage and an increased potential for erosion. Wildlife also would be disturbed along the pipeline route during the construction phase of the project. Short-term impacts on water quality would occur at trenched

Table 5-1
Resource Commitments Identified for the Proposed PSC CO_2 Pipeline Project

Resource	Impacts		Commitment of Resources	
	Short-Term	Long-Term	Irreversible	Irretrievable
Air Quality	x			
Geology and Soils	x[1]			
Minerals and Paleontological Resources	x	x[4]	x[4]	x[4]
Water Resources	x[2]			
Vegetation and Agriculture	x[3]	x[3]		
Wildlife	x			
Aquatic Resources	x			
Land Use and Recreation	x			
Wilderness	None			
Visual Resources and Noise	x	x[5]		
Socioeconomics	x	x		
Transportation	x			
Cultural Resources	x	x[4]	x[4]	x[4]

[1]Accelerated erosion would occur during construction and continue until erosion control measures were implemented; understory vegetation is expected to return to near preconstruction conditions within 5 years.

[2]Increased sedimentation would occur downstream of perennial stream crossings during construction. Near preconstruction conditions would be reestablished upon completion of the crossing and stabilization of any disturbed banks.

[3]Vegetation community structure and forage production would be lost on disturbed land for 2 to 5 growing seasons until grasses and forbs were reestablished; reestablishment of shrubs may take 10 to 30 years and trees would not be allowed to regrow in the ROW. This would result in long-term impacts to shrub and woody vegetation.

[4]There would be some gain in information for both cultural and paleontological resources as a result of the project; however, there could also be some long-term inadvertent irreversible and irretrievable commitment of resources.

[5]Visual effects of block valves/metering stations would be of long-term duration, but visual objectives would still be met at these locations.

pipeline stream crossings. Although grasses and forbs would become reestablished in the ROW within 5 years, shrubs may take up to 30 years to become established in the construction ROW. Trees greater than 10 inches in diameter would not be allowed to grow in the ROW. This would result in long-term effects to shrubs and woody species.

Minor short-term air quality degradation is expected from fugitive dust and construction equipment emissions along the pipeline ROW. Most traffic effects of the proposed project would be unavoidable, including increased traffic, the potential for increased accidents, and increased road maintenance requirements.

Long- and short-term impacts to visual resources are expected due to construction-related activities and the visibility of the reclaimed pipeline alignment. Short-term visual contrast in excess of the VRM Class II management objectives would be unavoidable. Minor visual contrast caused by noticeably different vegetation patterns and textures in reclaimed areas would be an unavoidable effect. Similar impacts to cultural resources (e.g., historic trails) would result from construction. Potential long-term impacts to cultural sites should be minor and partially offset by the gain in information as a result of planned project-committed protection measures.

Minor adverse impacts to minerals would be the preclusion of small areas from mining. The principal impact to mineral resources would be the positive impact on the enhanced recovery of oil in the Sussex, Salt Creek, and Hartzog Draw Unit well fields. Overall, socioeconomic impacts are also expected to be positive.

5.3 Cumulative Impacts

Cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR Part 1508.7). Where impacts are not fully mitigated or compensated, cumulative impacts can result.

Principal past actions that were considered in the evaluation of the cumulative impacts are those that have affected similar resources and for which the effect is still residual in the environment. For example, land disturbing projects that have adversely affected productivity for wildlife or livestock must be considered in the cumulative impact evaluation, if reclamation or off-site habitat enhancement have not compensated for that lost productivity.

Past actions in the vicinity of the pipeline that may have affected resources for which the effect is still residual include oil and gas development in the Salt Creek ACEC and the Sussex and Hartzog Draw Unit well fields, and existing pipelines that are parallel or intersect the Proposed Action. The most common residual cumulative impacts would be to vegetation productivity, visual resources, and any irreversible impacts to resources such as cultural and paleontological sites. Because the proposed pipeline would be constructed to the extent practical within existing utility ROWs and/or corridors, or in previously disturbed areas, cumulative impacts would be kept to a minimum. In addition, construction of the pipeline within the Salt Creek ACEC is not expected to result in any additional impacts to the managed area.

Future cumulative actions that are associated with the PSC Project are EOR in the Salt Creek, Sussex, and Hartzog Draw oil fields. As discussed in Section 1.7.1, Interrelated Projects, the addition of the CO_2 injection process would require construction of the following facilities in each field: above-ground pipeline (2- to 6-inch diameter) connection to the PSC pipeline; buried injection lines (2- to 6-inch diameter steel); buried gathering lines (6-inch steel for water and 6-inch steel for gas); buried return gathering line (10- to 20-inch fiberglass for CO_2 gas); CO_2 distribution header (approximately 40 feet x 40 feet); compressor facilities; and a CO_2 processing plant. Construction activities would be confined to previously disturbed land that is used for oil development. Operation activities would involve the production of oil from the CO_2 injection process. No new roads or maintenance activities would be required for the EOR process. Waste products resulting from the EOR activities would include glycol, heavier hydrocarbons, and amines. Nelms (2000) estimated that approximately 10 barrels/year of glycol, 10 barrels/year of amines, and 20 barrels/year of hydrocarbons would be produced by EOR at Westport's wells, which would require disposal at approved sites. Water filters, which would be replaced on a weekly basis, also would require disposal. These estimates are considered representative of the production of waste products for other operators who utilize EOR.

Initially, three operators may initiate EOR activities at their wells (ExxonMobil in the Hartzog Draw field, Howell in the Salt Creek field, and Westport in the Sussex field). After 2 or 3 years, other operators with active wells may include the EOR process as part of their operation. Discussions with Westport (Nelms 2000) and Howell (Geiger 2000) indicated that the area of disturbance would be approximately 25 and 15 acres, respectively. The majority of the disturbance area (10 acres) is associated with the CO_2 processing plant and compressor facilities. Westport would use EOR at 30 existing wells. Howell plans to use CO_2 injection at 9 existing wells for a 1- to 2-year pilot study. Depending upon the level of oil recovery, the EOR process would be used at additional wells in the future. The estimated disturbance area associated with ExxonMobil's implementation of the EOR process is expected to be in a similar range (15 to 25 acres).

Potential impacts on environmental resources resulting from the use of CO_2 injection in the EOR activities are listed in Table 5-2. No impacts are anticipated for cultural resources, surface and groundwater resources, land use, wetlands, recreation, wilderness, and threatened and endangered species. Additional NEPA analysis would be required for each operator, as part of the permit process.

A potential future project that was analyzed in the previous EA (BLM 1990) was the development of coal bed methane in the Powder River Basin. Although this is a major activity in the Powder River Basin, development would not extend into the project area for the proposed PSC pipeline.

Table 5-2
Potential Impacts of Using CO_2 Injection in EOR Activities

Environmental Resource	Impacts
Air Quality	• Beneficial effect resulting from the use of CO_2, which would reduce CO_2 emissions at the ExxonMobil La Barge Facility in southwest Wyoming • Temporary increase in fugitive dust resulting from construction equipment and trenching activities • Potential increased emissions in nitrogen oxide, carbon monoxide, carbon dioxide, and hydrogen sulfide due to operation of the CO_2 processing plant
Soils	• Temporary disturbance to soils in the trenched areas for the injection and gathering lines • Surface disturbance to soils in the locations for the CO_2 distribution header and the CO_2 processing plant
Geology	• Recovery and production of additional oil resulting from the increased effectiveness of CO_2 injection
Visual Resources	• Addition of above-ground facilities for the CO_2 connection pipeline, CO_2 distribution header, and the CO_2 processing plant to an existing oil field operation
Noise	• Noise increases for the CO_2 distribution header and the CO_2 processing plant; no sensitive receptors are located within the existing oil field
Vegetation	• Temporary disturbance to grass species due to trenching activities; long-term impacts on shrubs • Increased potential for noxious weed infestations
Wildlife	• Temporary disturbance to burrowing animals in the trenched areas • Temporary displacement of birds and other mobile wildlife species due to the increased noise and human activity during construction
Hazardous Materials/Wastes	• Generation of glycol, heavier hydrocarbons, and amines for each operation, which would require disposal at approved sites
Socioeconomics	• Increased revenues for recovery of additional oil